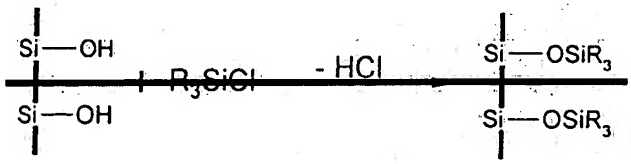
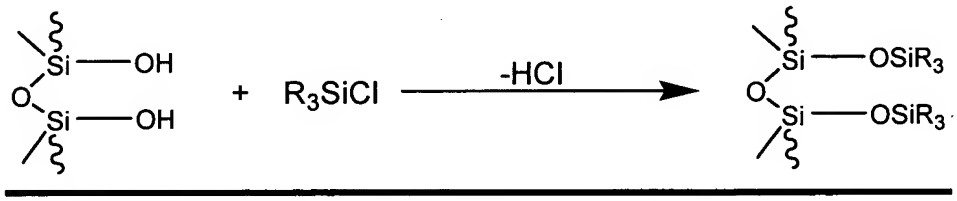
## AMENDMENTS TO THE SPECIFICATION

**Please amend paragraph [0009] as follows:**

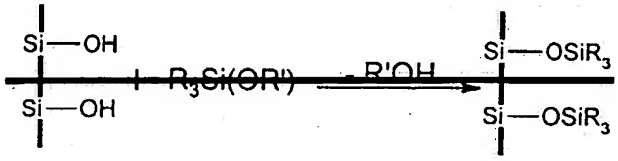
[0009] Metallocene catalysts with suitable functional groups can be supported on a silica surface by the reaction of an alkoxysilane or halosilane functional group with a surface hydroxyl group or highly reactive siloxane group, which is formed from the dehydroxylation of the silica above 600°C, as shown in Reaction Formulas 1 through 3.

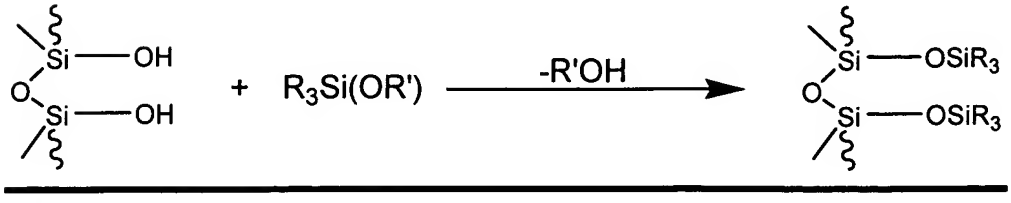
Reaction Formula 1



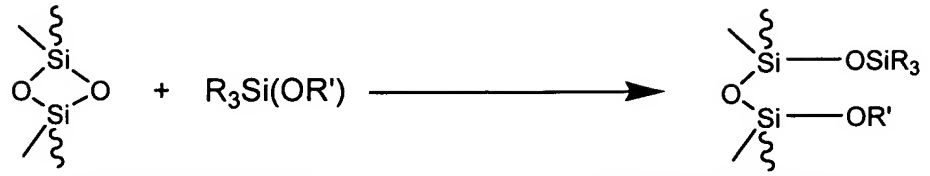




Reaction Formula 2



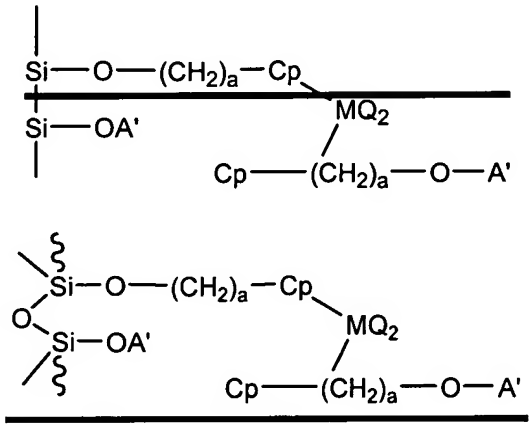




Reaction Formula 3




**Please amend paragraph [0020] as follows:**

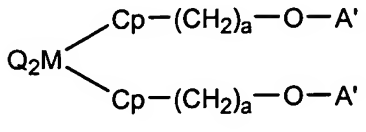
**[0020]** In a second embodiment, a supported metallocene catalyst is provided, the supported metallocene catalyst represented by formula:



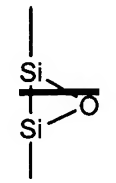

wherein M comprises a transition metal of Group 4; Cp, which can be the same or different, comprises a cyclopentadienyl ring, wherein the cyclopentadienyl ring is unsubstituted or substituted by a moiety selected from the group consisting of alkyl, cycloalkyl, aryl, alkenyl, alkylaryl, arylalkyl, and arylalkenyl; Q, which can be the same or different, comprises halogen or a moiety comprising from 1 to 20 carbon atoms, wherein the moiety is selected from the group consisting of alkyl, alkenyl, aryl, alkylaryl, arylalkyl, and alkylidene, wherein the alkyl, alkenyl, aryl, alkylaryl, arylalkyl, and alkylidene; A', which can be the same or different, is selected from the group consisting of methoxymethyl, t-butoxymethyl, tetrahydropyranyl, tetahydrofuranyl, 1-ethoxylethyl, 1-methyl-1-methoxyethyl, and t-butyl; and a comprises an integer of from 4 to 8.

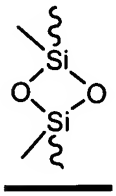
**Please amend paragraph [0023] as follows:**

[0023] In a third embodiment, a method for preparing a supported metallocene catalyst is provided, the method comprising the step of reacting a metallocene compound of Chemical Formula 7:

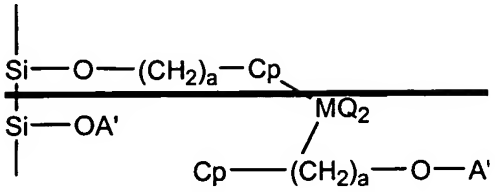


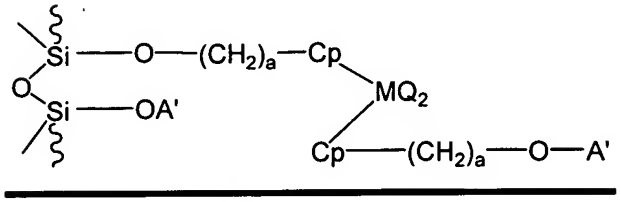

with a silica support of formula:



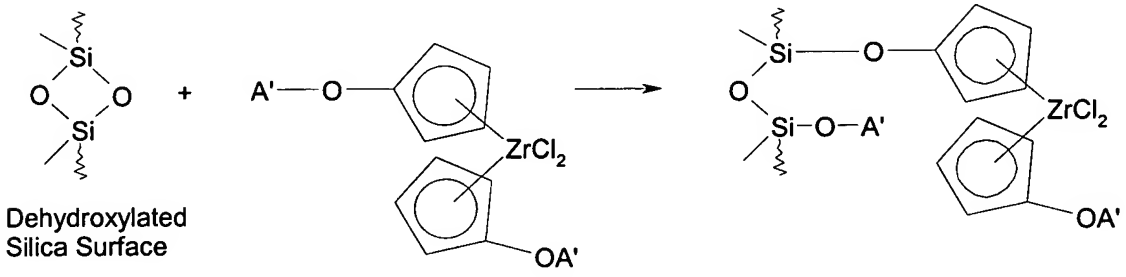

in an organic solvent, wherein: M comprises a transition metal of Group 4; Cp, which can be the same or different, comprises a cyclopentadienyl ring, wherein the cyclopentadienyl ring is unsubstituted or substituted by a moiety selected from the group consisting of alkyl, cycloalkyl, aryl, alkenyl, alkylaryl, arylalkyl, and arylalkenyl; Q, which can be the same or different, comprises halogen or a moiety comprising from 1 to 20 carbon atoms, wherein the moiety is selected from the group consisting of alkyl, alkenyl, aryl, alkylaryl, arylalkyl, and alkylidene, wherein the alkyl, alkenyl, aryl, alkylaryl, arylalkyl, and alkylidene; A', which can be the same or different, is selected from the group consisting of methoxymethyl, t-butoxymethyl, tetrahydropyranyl, tetahydrofuranyl, 1-ethoxylethyl, 1-methyl-1-methoxyethyl, and t-butyl; and a comprises an integer of from 4 to 8; whereby one O-A' bond in the metallocene compound of Chemical Formula 7 is cleaved and two new bonds are formed, wherein the metallocene compound is bonded to a silica atom of the silica support via an oxygen atom, and simultaneously A' is bonded to another silica atom of the silica support via an oxygen atom, to yield a supported metallocene catalyst of formula:



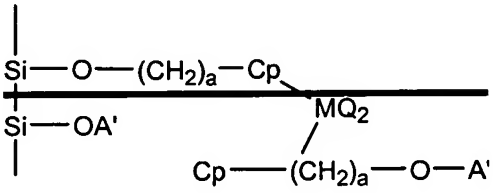

whereby one of the O-A' bonds in the Chemical Formula 1 is cleaved so that the metallocene compound is bonded to a silica atom of the silica support via an oxygen atom, and simultaneously A' is bonded to another silica atom of the silica support via an oxygen atom, as depicted in Reaction Formula 5.

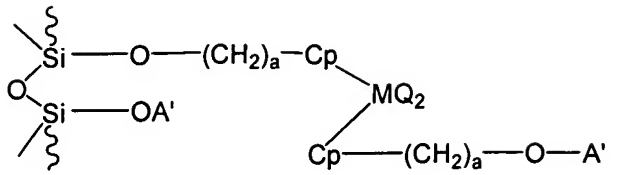
Reaction Formula 5



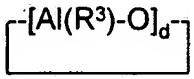

**Please amend paragraph [0027] as follows:**

**[0027]** In a fourth embodiment, a process for olefin polymerization is provided which comprises conducting the polymerization in the presence of the catalyst system comprising a supported metallocene catalyst represented by the formula:





and one or more co-catalysts selected from the compounds described by the following Chemical Formulae 8, 9, 10, or 11 wherein Chemical Formulae 8 and 9 are respectively:

$(R^3)_2Al\text{-}O\text{-}[Al(R^3)\text{-}O]_d\text{-}Al(R^3)_2$ or 

wherein each $R^3$, which can be the same or different, is a halogen atom, a hydrocarbyl group having from 1 to 40 carbon atoms, or a halogen substituted hydrocarbyl group having from 1 to 40 carbon atoms; and d is an integral number greater than 2; wherein Chemical Formula 10 is:

$$Al(R^4)_3$$

wherein each $R^4$, which can be the same as or different, is a halogen atom, a hydrocarbyl group having from 1 to 40 carbon atoms, or a halogen substituted hydrocarbyl group having from 1 to 40 carbon atoms); and wherein Chemical Formula 11 is:

$$[L]^+[NE_4]^-$$

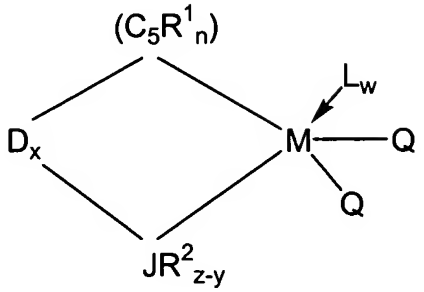
wherein, $[L]^+$ is a cation composed of an inorganic or organic group; N is an element of Group 13 (IVB in the previous IUPAC form); and each E, which can be the same as or different from other E, is an aryl group having from 6 to 40 carbon atoms, where at least one of the hydrogen atoms of the aryl group is substituted with a halogen atom, a hydrocarbyl group having from 1 to 40 carbon atoms, an alkoxy group, a phenoxy group, or a hydrocarbyl group having from 1 to 40 carbon atoms with nitrogen, phosphorus, sulfur, or oxygen atom.

**Please amend paragraph [0029] as follows:**

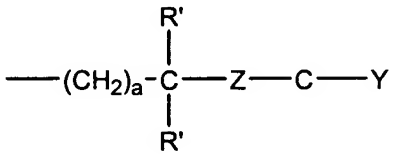
**[0029]** In a sixth embodiment, a supported metallocene catalyst is provided that is prepared by the reaction of a metallocene compound of Chemical Formula 1 or Chemical Formula 2 with a silica support in an organic solvent, wherein Chemical Formula 1 comprises:

$$(C_5R^1{}_m)_pD_s(C_5R^1{}_m)MQ_{3-p}$$

and wherein Chemical Formula 2 comprises:

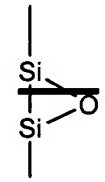


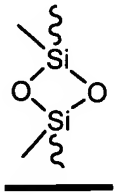

wherein at least one hydrogen atom of $R^1$, $R^2$, and D is substituted by a group of Chemical Formula 6, wherein: M is a transition metal of Group 4; $(C_5R^1_m)$ and $(C_5R^1_n)$ each comprise a cyclopentadienyl ring, wherein each $R^1$, which can be the same or different, is selected from the group consisting of hydrogen, $C_{1-40}$ alkyl, $C_{1-40}$ cycloalkyl, $C_{1-40}$ aryl, $C_{1-40}$ alkenyl, $C_{1-40}$ alkylaryl, $C_{1-40}$ arylalkyl, $C_{1-40}$ arylalkenyl, and a metalloid of Group 14 substituted by a hydrocarbyl group; and two $R^1$ can form a hydrocarbyl group which joins together two adjacent carbon atoms of a cyclopentadienyl ring to form one or more $C_4 - C_{16}$ rings; D is selected from the group consisting of an alkylene carbon chain, an arylene carbon chain, an alkenylene carbon chain, a dialkyl germanium, a dialkyl silicon, an alkyl ~~phospine~~ phosphine, an alkyl amine group substituting on and bridging two cyclopentadienyl ligands, and an alkyl amine group substituting on and bridging a cyclopentadienyl ligand and $JR^2_{z-y}$ ligand by a covalent bond; $R^2$ is selected from the group consisting of hydrogen, $C_{1-40}$ alkyl, $C_{1-40}$ aryl, $C_{1-40}$ alkenyl, $C_{1-40}$ alkylaryl, and $C_{1-40}$ arylalkyl; J comprises an element of Group 15 or Group 16; each Q, which can be the same or different, is selected from the group consisting of halogen, $C_{1-20}$ alkyl, $C_{1-20}$ alkenyl, $C_{1-20}$ aryl, $C_{1-20}$ alkylaryl, and $C_{1-20}$ alkylidene; L comprises a Lewis base; s is 0 or 1 and p is 0, 1 or 2, provided that when p is 0 then s is 0, when s is 1 then m is 4, and when s is 0 then m is 5; z is a valence number of J, provided that when J is an atom of Group 15 then z is 3, and when J is an atom of Group 16 then z is 2; x is 0 or 1, provided that when x is 0 then n is 5, y is 1, and w is greater than 0, and when x is 1, then n is 4, y is 2, and w is 0; and wherein Chemical Formula 6 comprises:




wherein, Z is oxygen atom or sulfur atom; each R', which can be the same or different, is selected from the group consisting of hydrogen, $C_{1-20}$ alkyl, $C_{1-20}$ cycloalkyl, $C_{1-20}$ aryl, $C_{1-20}$

alkenyl, $C_{1-20}$ alkylaryl, $C_{1-20}$ arylalkyl, and $C_{1-20}$ arylalkenyl; and two R' can join together to form a ring; Y is selected from the group consisting of hydrogen, $C_{1-20}$ alkyl, $C_{1-20}$ cycloalkyl, $C_{1-20}$ aryl, $C_{1-20}$ alkenyl, $C_{1-20}$ alkylaryl, $C_{1-20}$ arylalkyl, $C_{1-20}$ arylalkenyl, $C_{1-20}$ alkoxy, $C_{1-20}$ aryloxy, $C_{1-20}$ alkylthio, $C_{1-20}$ arylthio, phenyl, and substituted phenyl; and Y and R' can join together to form a ring; a is an integer of 4 to 8, provided that when Z is a sulfur atom then Y is alkoxy or aryloxy; and when Y is not an alkoxy or aryloxy then Z is an oxygen atom; and wherein the silica support is of formula:



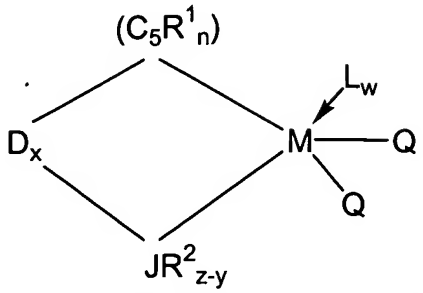

whereby an oxygen-carbon bond in Chemical Formula 6 of the metallocene compound is cleaved to yield a metallocene compound portion and a remaining portion, and whereby the metallocene compound portion is bonded to a silica atom of the silica support via an oxygen atom, and simultaneously the remaining portion is bonded to another silica atom of the silica support via an oxygen atom.

**Please amend paragraph [0030] as follows:**

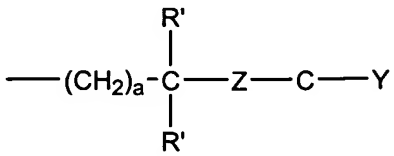
**[0030]** In a seventh embodiment, a supported metallocene catalyst is provided that is prepared by the reaction of a metallocene compound of Chemical Formula 1 or Chemical Formula 2 with a silica support, wherein Chemical Formula 1 comprises:

$$(C_5R^1{}_m)_pD_s(C_5R^1{}_m)MQ_{3-p}$$

and wherein Chemical Formula 2 comprises:

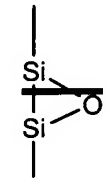


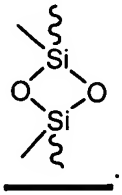

wherein at least one hydrogen atom of $R^1$, $R^2$, and D is substituted by a group of Chemical Formula 6, wherein: M is a transition metal of Group 4; $(C_5R^1_m)$ and $(C_5R^1_n)$ each comprise a cyclopentadienyl ring, wherein each $R^1$, which can be the same or different, is selected from the group consisting of hydrogen, $C_{1-40}$ alkyl, $C_{1-40}$ cycloalkyl, $C_{1-40}$ aryl, $C_{1-40}$ alkenyl, $C_{1-40}$ alkylaryl, $C_{1-40}$ arylalkyl, $C_{1-40}$ arylalkenyl, and a metalloid of Group 14 substituted by a hydrocarbyl group; and two $R^1$ can form a hydrocarbyl group which joins together two adjacent carbon atoms of a cyclopentadienyl ring to form one or more $C_4 - C_{16}$ rings; D is selected from the group consisting of an alkylene carbon chain, an arylene carbon chain, an alkenylene carbon chain, a dialkyl germanium, a dialkyl silicon, an alkyl ~~phospine~~ phosphine, an alkyl amine group substituting on and bridging two cyclopentadienyl ligands, and an alkyl amine group substituting on and bridging a cyclopentadienyl ligand and $JR^2_{z-y}$ ligand by a covalent bond; $R^2$ is selected from the group consisting of hydrogen, $C_{1-40}$ alkyl, $C_{1-40}$ aryl, $C_{1-40}$ alkenyl, $C_{1-40}$ alkylaryl, and $C_{1-40}$ arylalkyl; J comprises an element of Group 15 or Group 16; each Q, which can be the same or different, is selected from the group consisting of halogen, $C_{1-20}$ alkyl, $C_{1-20}$ alkenyl, $C_{1-20}$ aryl, $C_{1-20}$ alkylaryl, and $C_{1-20}$ alkylidene; L comprises a Lewis base; s is 0 or 1 and p is 0, 1 or 2, provided that when p is 0 then s is 0, when s is 1 then m is 4, and when s is 0 then m is 5; z is a valence number of J, provided that when J is an atom of Group 15 then z is 3, and when J is an atom of Group 16 then z is 2; x is 0 or 1, provided that when x is 0 then n is 5, y is 1, and w is greater than 0, and when x is 1, then n is 4, y is 2, and w is 0; and wherein Chemical Formula 6 comprises:




wherein, Z is oxygen atom or sulfur atom; each R', which can be the same or different, is selected from the group consisting of hydrogen, $C_{1-20}$ alkyl, $C_{1-20}$ cycloalkyl, $C_{1-20}$ aryl, $C_{1-20}$ alkenyl, $C_{1-20}$ alkylaryl, $C_{1-20}$ arylalkyl, and $C_{1-20}$ arylalkenyl; and two R' can join together to

form a ring; Y is selected from the group consisting of hydrogen, $C_{1-20}$ alkyl, $C_{1-20}$ cycloalkyl, $C_{1-20}$ aryl, $C_{1-20}$ alkenyl, $C_{1-20}$ alkylaryl, $C_{1-20}$ arylalkyl, $C_{1-20}$ arylalkenyl, $C_{1-20}$ alkoxy, $C_{1-20}$ aryloxy, $C_{1-20}$ alkylthio, $C_{1-20}$ arylthio, phenyl, and substituted phenyl; and Y and R' can join together to form a ring; a is an integer of 4 to 8, provided that when Z is a sulfur atom then Y is alkoxy or aryloxy; and when Y is not an alkoxy or aryloxy then Z is an oxygen atom; and wherein the silica support is of formula:



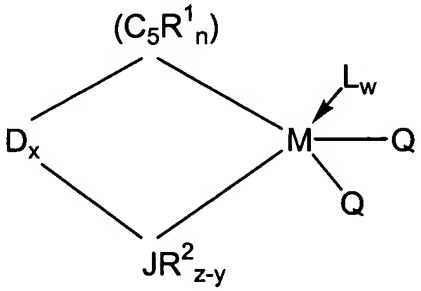




**Please amend paragraph [0031] as follows:**

**[0031]** In an eighth embodiment, a process for olefin polymerization is provided which comprises conducting the polymerization in the presence of the catalyst system comprising a supported metallocene catalyst prepared by the reaction of reaction of a metallocene compound of Chemical Formula 1 or Chemical Formula 2 with a silica support and at least one co-catalyst, wherein Chemical Formula 1 comprises:

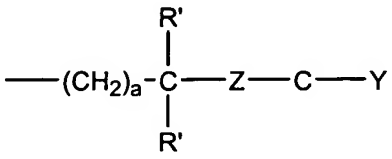
$$(C_5R^1{}_m)_pD_s(C_5R^1{}_m)MQ_{3-p}$$

and wherein Chemical Formula 2 comprises:

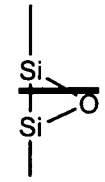


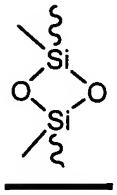

wherein at least one hydrogen atom of $R^1$, $R^2$, and D is substituted by a group of Chemical Formula 6, wherein: M is a transition metal of Group 4; $(C_5R^1{}_m)$ and $(C_5R^1{}_n)$ each comprise a

cyclopentadienyl ring, wherein each $R^1$, which can be the same or different, is selected from the group consisting of hydrogen, $C_{1-40}$ alkyl, $C_{1-40}$ cycloalkyl, $C_{1-40}$ aryl, $C_{1-40}$ alkenyl, $C_{1-40}$ alkylaryl, $C_{1-40}$ arylalkyl, $C_{1-40}$ arylalkenyl, and a metalloid of Group 14 substituted by a hydrocarbyl group; and two $R^1$ can form a hydrocarbyl group which joins together two adjacent carbon atoms of a cyclopentadienyl ring to form one or more $C_4 - C_{16}$ rings; D is selected from the group consisting of an alkylene carbon chain, an arylene carbon chain, an alkenylene carbon chain, a dialkyl germanium, a dialkyl silicon, an alkyl ~~phospine~~ phosphine, an alkyl amine group substituting on and bridging two cyclopentadienyl ligands, and an alkyl amine group substituting on and bridging a cyclopentadienyl ligand and $JR^2_{z-y}$ ligand by a covalent bond; $R^2$ is selected from the group consisting of hydrogen, $C_{1-40}$ alkyl, $C_{1-40}$ aryl, $C_{1-40}$ alkenyl, $C_{1-40}$ alkylaryl, and $C_{1-40}$ arylalkyl; J comprises an element of Group 15 or Group 16; each Q, which can be the same or different, is selected from the group consisting of halogen, $C_{1-20}$ alkyl, $C_{1-20}$ alkenyl, $C_{1-20}$ aryl, $C_{1-20}$ alkylaryl, and $C_{1-20}$ alkylidene; L comprises a Lewis base; s is 0 or 1 and p is 0, 1 or 2, provided that when p is 0 then s is 0, when s is 1 then m is 4, and when s is 0 then m is 5; z is a valence number of J, provided that when J is an atom of Group 15 then z is 3, and when J is an atom of Group 16 then z is 2; x is 0 or 1, provided that when x is 0 then n is 5, y is 1, and w is greater than 0, and when x is 1, then n is 4, y is 2, and w is 0; and wherein Chemical Formula 6 comprises:



wherein, Z is oxygen atom or sulfur atom; each R', which can be the same or different, is selected from the group consisting of hydrogen, $C_{1-20}$ alkyl, $C_{1-20}$ cycloalkyl, $C_{1-20}$ aryl, $C_{1-20}$ alkenyl, $C_{1-20}$ alkylaryl, $C_{1-20}$ arylalkyl, and $C_{1-20}$ arylalkenyl; and two R' can join together to form a ring; Y is selected from the group consisting of hydrogen, $C_{1-20}$ alkyl, $C_{1-20}$ cycloalkyl, $C_{1-20}$ aryl, $C_{1-20}$ alkenyl, $C_{1-20}$ alkylaryl, $C_{1-20}$ arylalkyl, $C_{1-20}$ arylalkenyl, $C_{1-20}$ alkoxy, $C_{1-20}$ aryloxy, $C_{1-20}$ alkylthio, $C_{1-20}$ arylthio, phenyl, and substituted phenyl; and Y and R' can join together to form a ring; a is an integer of 4 to 8, provided that when Z is a sulfur atom then Y is alkoxy or aryloxy; and when Y is not an alkoxy or aryloxy then Z is an oxygen atom; wherein the silica support is of formula:




and wherein the co-catalyst is selected from the compounds described by the following Chemical Formulae 8, 9, 10, or 11 wherein Chemical Formulae 8 and 9 are respectively:

$$(R^3)_2Al\text{-}O\text{-}[Al(R^3)\text{-}O]_d\text{-}Al(R^3)_2 \text{ or } \left[\text{-}[Al(R^3)\text{-}O]_d\text{-}\right]$$

wherein each $R^3$, which can be the same or different, is a halogen atom, a hydrocarbyl group having from 1 to 40 carbon atoms, or a halogen substituted hydrocarbyl group having from 1 to 40 carbon atoms; and d is an integral number greater than 2; wherein Chemical Formula 10 is:

$$Al(R^4)_3$$

wherein each $R^4$, which can be the same as or different, is a halogen atom, a hydrocarbyl group having from 1 to 40 carbon atoms, or a halogen substituted hydrocarbyl group having from 1 to 40 carbon atoms); and wherein Chemical Formula 11 is:

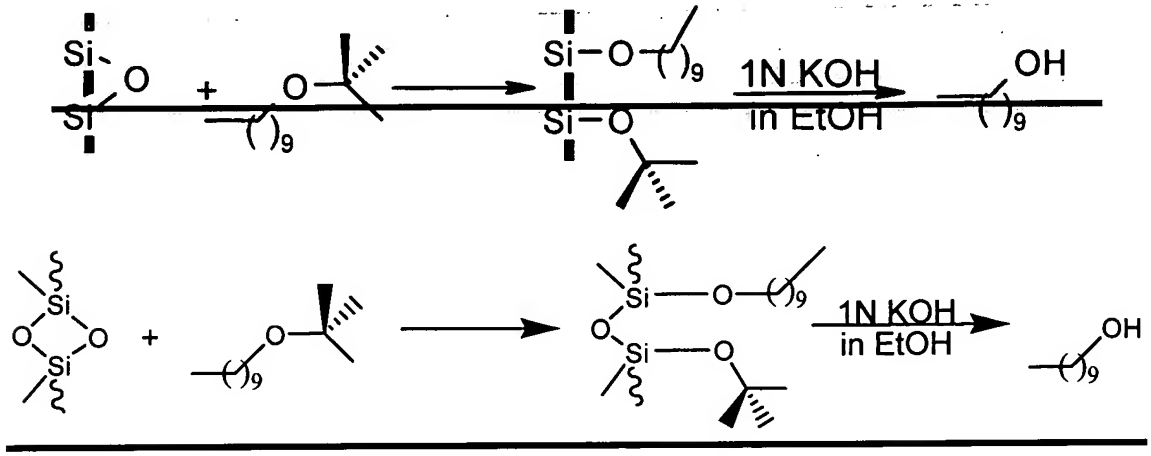
$$[L]^+[NE_4]^-$$

wherein, $[L]^+$ is a cation composed of an inorganic or organic group; N is an element of Group 13 (IVB in the previous IUPAC form); and each E, which can be the same as or different from other E, is an aryl group having from 6 to 40 carbon atoms, where at least one of the hydrogen atoms of the aryl group is substituted with a halogen atom, a hydrocarbyl group having from 1 to 40 carbon atoms, an alkoxy group, a phenoxy group, or a hydrocarbyl group having from 1 to 40 carbon atoms with nitrogen, phosphorus, sulfur, or oxygen atom.

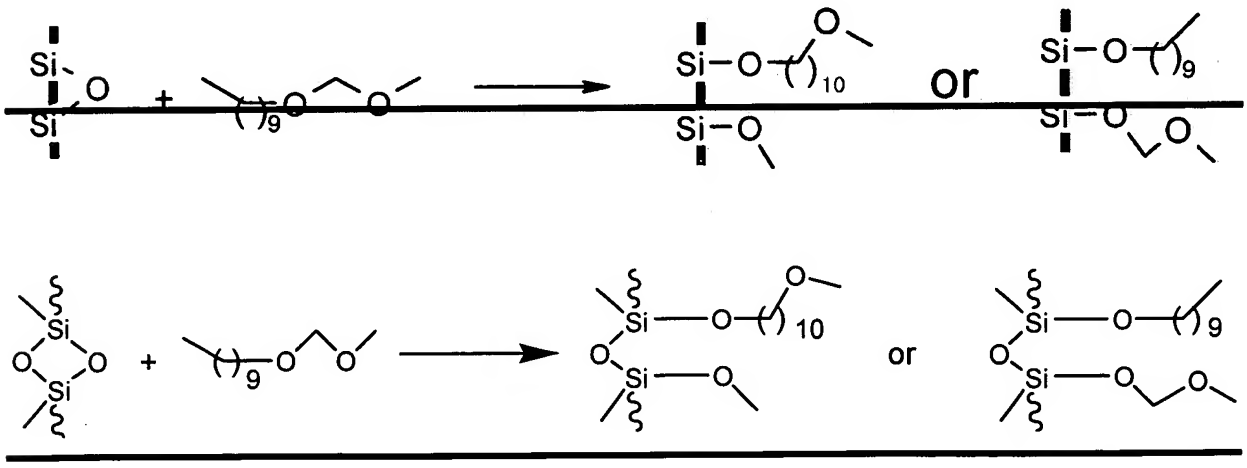
**Please amend paragraph [0059] as follows:**

[0059] The preferred embodiments utilize the reaction of the highly reactive siloxane group on the silica surface with the above functional groups containing a labile C-O bond, as depicted in Reaction Formulae 9a and 9b.

Reaction Formula 9a



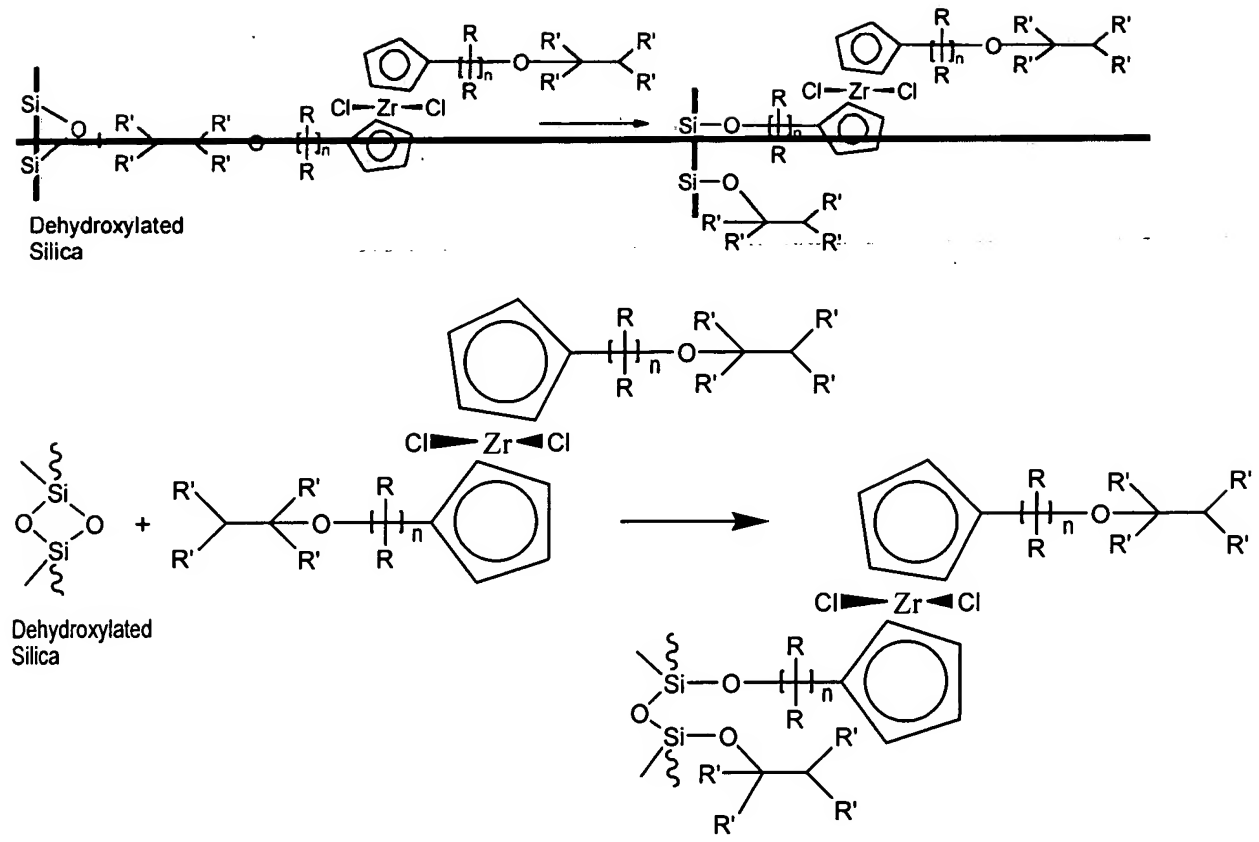

Reaction Formula 9b



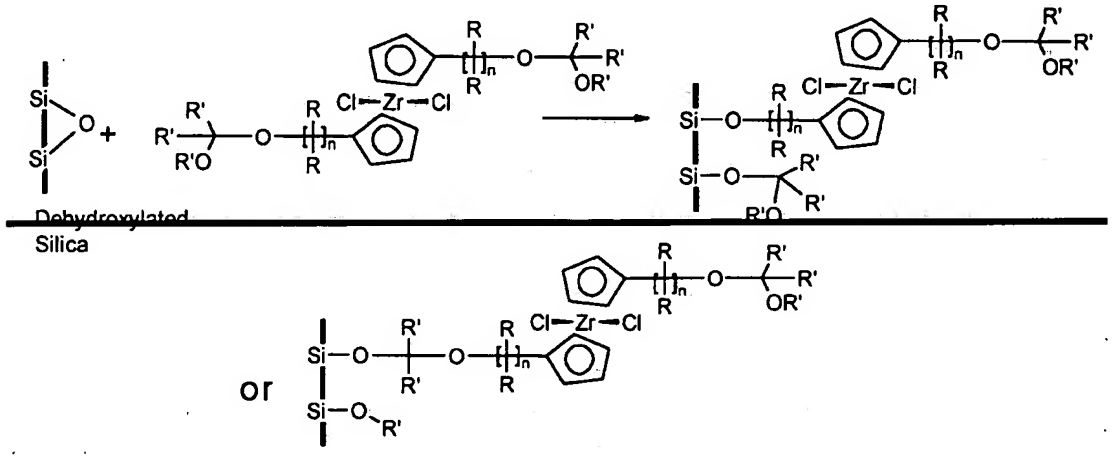

**Please amend paragraph [0062] as follows:**

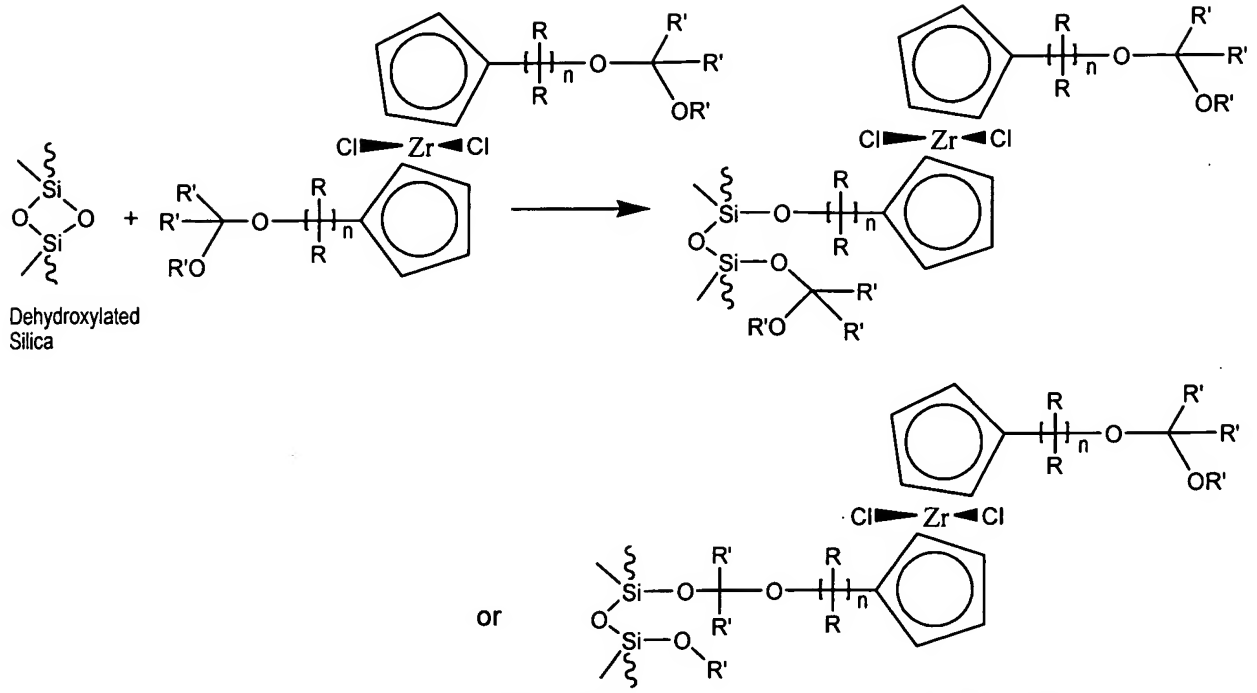
[0062] The following Reaction Formulae 11-13 provide schemes demonstrating the reaction of metallocene compounds containing functional groups such as acetal, ketal, tertiary alkoxy alkyl, benzyloxy alkyl, substituted benzyloxy alkyl, monothioacetal, or monothioketal with a highly reactive silica surface.

Reaction Formula 11

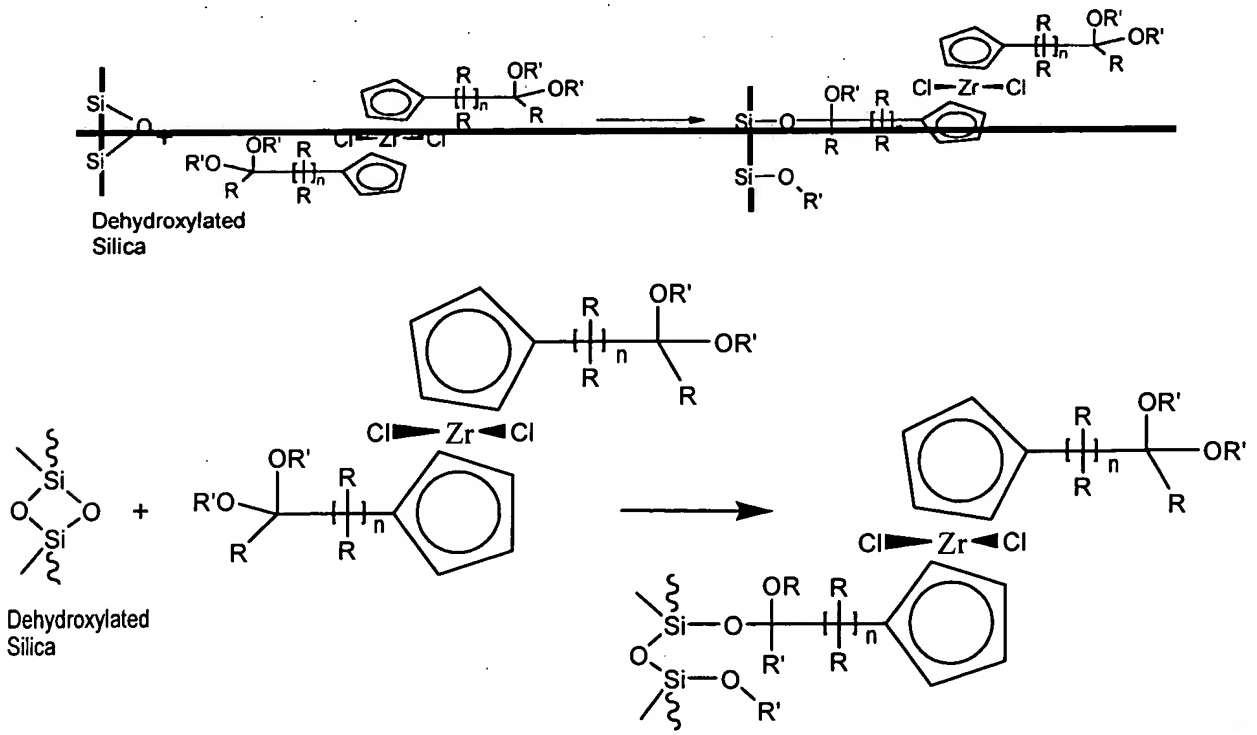



Reaction Formula 12






Reaction Formula 13




wherein each R and R', which can be same or different, are hydrogen atoms, alkyl, cycloalkyl, aryl, alkenyl, alkylaryl, arylalkyl, or arylalkenyl groups, and two R' can join together to form a ring.